

[54] DYNAMIC LOUDSPEAKER USING WALL AS DIAPHRAGM

3,636,281 1/1972 Cozart179/181 W
3,609,253 9/1971 Ashworth179/115.5 R

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[57] ABSTRACT

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A hollow pillar portion is connected to the damper or casing of a transducer to mount the transducer onto a support on board member by a screw which passes through the hollow pillar portion. The hollow pillar portion enables both the low and high frequency characteristics to be maintained and enables the transducer to be affixed to the board member without rotation of the transducer.

[52] U.S. Cl.179/181 W, 179/115.5 R

[51] Int. Cl.H04r 9/04

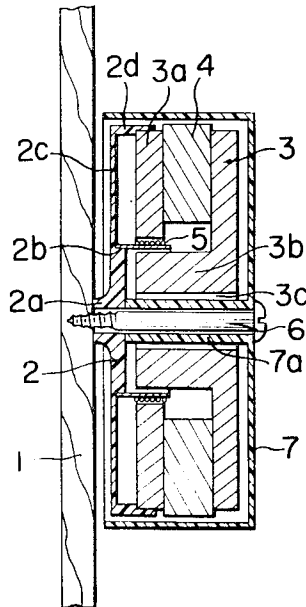
[58] Field of Search179/181 W, 115.5 R;
310/15, 27

[56] References Cited

3 Claims, 3 Drawing Figures

UNITED STATES PATENTS

3,366,749 1/1968 Ries179/115.5 R



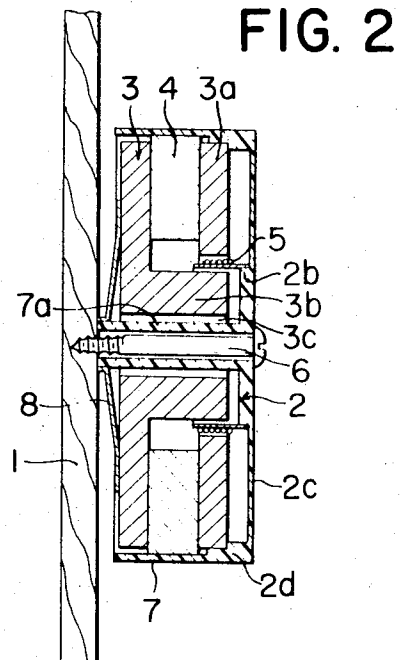
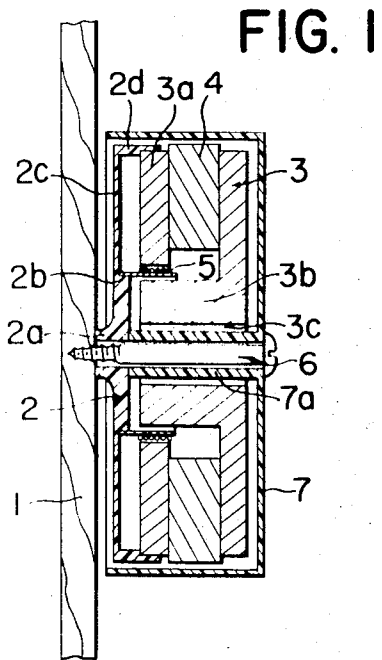
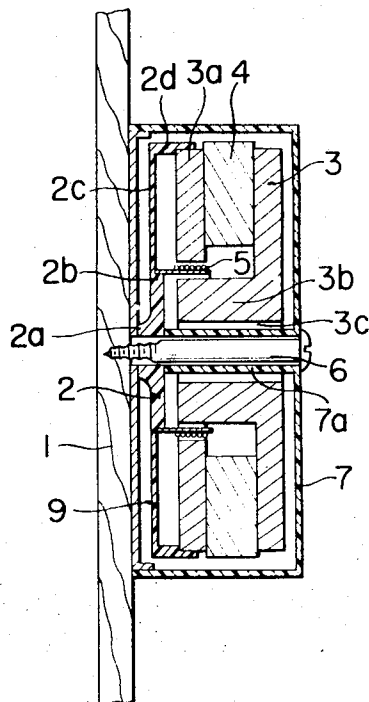


FIG. 3



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DYNAMIC LOUDSPEAKER USING WALL AS DIAPHRAGM

This invention relates to a dynamic transducer for converting electrical energy into sound energy, and is particularly concerned with an audio transducer which will be mounted on a board member in a room such as a wall or ceiling.

About the above transducer, the construction which determines the manner of mounting is important. However, as far as I know, various heretofore known constructions do not permit satisfactory mounting without an accompanying sacrifice of performance in the transducer. For example, in a type of transducer wherein a wood screw is attached to a damper or a diaphragm as shown in U.S. Pat. Ser. No. 3,430,007, the damper or the diaphragm must be sufficiently strong and stiff so as to withstand the torque necessary for screwing the wood screw into a board member in the room. But, it is undesirable to increase the strength and stiffness of the damper since the efficiency of the transducer is reduced especially in the low frequency zone. Further, as the type of transducer above mentioned is mounted on a board by rotation of the transducer, lead wires connected to the terminals are often twisted and entangled.

The damper may be one with suitable stiffness, if the transducer is constructed so as to be screwed into a base plate previously fixed on a wall. The transducer shown in U.S. Pat. Ser. No. 3,366,749 is one of this type. But, this type of transducer must be also mounted by rotation.

Transducers can be mounted without rotation, if a flange plate is provided thereon as a member for mounting. However, this type of transducer has low efficiency especially in the high frequency zone owing to a spring action caused by the path through which vibration is transmitted. When the wall is one with considerable thickness and stiffness, the above spring action is suppressed. Accordingly, the transducer of the last mentioned type may be used satisfactorily in particular cases where the spring action is suppressed by the nature of the wall or the like.

The principal object of the present invention is to provide an improved dynamic transducer in which the above explained difficulties are overcome.

According to the present invention, there is provided a dynamic transducer characterized in that a hollow pillar portion is connected to the damper of the voice coil, and the hollow pillar portion passes through a hole in the center pole of the magnet of the transducer, the internal diameter of the hole in the magnet through which the hollow pillar portion passes being larger than the external diameter of the hollow pillar portion, and a screw for mounting the transducer on a board member in the room being admitted through and spaced from the hollow pillar portion.

Other objects and advantages of the present invention will be apparent from the following description of the accompanying drawings in which:

FIG. 1 is a longitudinally sectioned view of a dynamic transducer according to the present invention;

FIG. 2 is a longitudinally sectioned view of another dynamic transducer according to the present invention;

FIG. 3 is a longitudinally sectioned view of still another dynamic transducer according to the present invention.

The transducer shown in FIG. 1 is mounted on a board member 1. The magnet of this transducer is composed of a yoke 3 and a permanent magnet 4. The plate portion and the center pole portion of the magnet are shown by the numerals 3a, 3b respectively. The magnet is provided with a hole 3c which passes through the center pole 3b of the magnet.

The damper of the transducer comprises a boss portion 2a which engages with the board member 1, a supporting portion 2b for a voice coil 5, a spring portion 2c and a portion 2d which engages with the magnet. The boss portion 2a is provided with a center hole which a wood screw 6 passes through. The portion 2d is engaged with and fixed to the outer peripheral surface of the plate portion 3a of the magnet, thus, determining the position of the voice coil 5 in the air gap of the magnet.

A case 7 with a central pillar or cylindrical portion 7a is provided for enclosing the above mentioned various parts. The pillar portion 7a passes through the hole 3c of the center pole 3b. There is a sufficient space between the center pole 3b and the pillar portion 7a to avoid any mutual contact therebetween. The pillar portion 7a is hollow and a wood screw 6 passes freely through this portion 7a and the hole of the boss portion 2a of the damper 2. The hollow pillar portion 7a of the case 7 is fixed to the damper 2. In this modification the case 7 does not contact with the magnet and vibrates together the board member 1.

The transducer is mounted on the board member 1 by the wood screw 6 following a process wherein any turning of the transducer and stresses on the vibrating spring portion 2c of the damper 2 are eliminated.

The damper 2 can be made as a single unit thus improving the low frequency zone characteristics, and furthermore, the boss portion 2a of the damper 2 having a small area the board member 1 at its front end thus, improving high frequency zone characteristics.

The construction shown in FIG. 1 can be modified as shown in FIG. 2. In the case of the transducer shown in FIG. 2, the damper 2 is formed as a part of the case 7 and arranged remote from the inner board member 1. Between the end of the pillar portion 7a and the yoke 3, a member 8 is disposed as a dust cover. This member 8 may be modified to one which acts as a damper. Then, the transducer becomes a type wherein dampers are disposed on both sides. The transducer is mounted on a board member 1 similarly to the transducer shown in FIG. 1. The voice coil 5 is arranged remote from the board member 1, but the performance of the transducer is the same as that of the transducer shown in FIG. 1.

The transducer shown in FIG. 3 is provided with a inner end plate 9 which covers the open end of the case. This type of transducer is the same with that shown in FIG. 1 except for the provision of the end plate 9.

What I claim is:

1. A dynamic transducer comprising a disc shaped damper member having a relatively thick hub portion having a central opening therethrough and a relatively thin outer portion, a voice coil mounted on an axially extending sleeve having one end thereof secured to said damper member, an annular magnetic assembly including an annular permanent magnet and an annular yoke portion providing an axially extending gap into which

3

said voice coil extends, said magnetic assembly being secured to and supported by said outer portion of said damper member, a hollow pillar member one end of which extends from said hub portion through and spaced from the center of said annular magnetic assembly and having a hole therethrough in alignment with the central opening in said hub portion and a screw member extending through and spaced from said pillar member and said hub portion for attaching the transducer to a support, the head of the screw member

4

transmitting the attaching force through said pillar member and said hub portion.

2. A dynamic transducer as claimed in claim 1 and further comprising a casing and wherein said pillar member is attached to said casing.

3. A dynamic transducer as claimed in claim 1 wherein said pillar member is attached to the hub portion of said damper member.

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